



Programming in C

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Description

This book, PROGRAMMING IN C, serves as an essential, comprehensive resource for mastering the C programming language, grounded in the foundational principles of computer science. The core theme is the seamless synergy between algorithmic problem-solving and practical, efficient C implementation. It begins by establishing a robust understanding of computational fundamentals, detailing the evolution of programming languages, and exploring key system components like Hardware, Software, Processor, and Memory.

The book's purpose is to mold readers into effective computational thinkers. It meticulously guides users through the art of problem-solving using structured techniques like Algorithms, Flowcharts, and Pseudocode. Crucially, it dedicates significant attention to measuring program performance through Time and Space Complexity (Big O Notation), enabling students to write code that is not only correct but also scalable and optimized.

Readers will gain mastery over the C program structure, fundamental data types, operators, and advanced concepts such as Modular Programming with Functions (including recursion and call-by-reference). Key data structures like Arrays, Strings, Pointers, and Structures are covered in depth. The target audience includes undergraduate students, aspiring software developers, and researchers who require a robust, hands-on, and efficiency-focused guide to system-level programming and computational logic.

Salient Features:

- **Fundamental Computing Overview:** The book starts with the basics of computer systems, covering Hardware, Software, Processor, and Memory, establishing a strong foundation before diving into coding.
- **Algorithmic Mastery:** Teaches problem-solving using Algorithms, Flowcharts, and Pseudocode, acting as a blueprint for translating logical steps into clean, efficient code.
- **Efficiency Analysis:** Dedicated coverage of Time and Space Complexity (Big O Notation) ensures students learn to analyze algorithm efficiency and optimize programs for scalability and speed.
- **Modular Programming:** Master code organization using Functions (user-defined and library), covering concepts like parameter passing (Pass by Value/Reference) and advanced techniques like Recursion.
- **Control Flow Logic:** Clear explanations and examples of Decision-Making (if-else, switch) and Looping (for, while, do-while) statements, enabling the creation of dynamic and interactive programs.
- **Essential Data Structures:** Comprehensive units on managing data using Arrays (1D and Multi-dimensional), Strings, Pointers, and powerful heterogeneous containers like Structures and Unions.
- **Hands-On Learning:** Features multiple fully-coded Case Studies and Exercises on practical applications, including sorting, searching, calculating prime numbers, and building a scientific calculator.

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